

**Commonwealth of Kentucky  
Division for Air Quality**

**PERMIT APPLICATION SUMMARY FORM**

Completed by: Sukhendu K Majumdar

GENERAL INFORMATION:

Name:	Marathon Petroleum Company, LLC Catlettsburg Refining, LLC.
Address:	P.O. Box 1492 Catlettsburg, KY 41129
Date application received:	December 14, 1998
SIC/Source description:	2911
Source ID #:	21-019-00004
Source A.I. #:	339
Activity #:	APE20040002
Permit number:	V-05-089

APPLICATION TYPE/PERMIT ACTIVITY:

<input checked="" type="checkbox"/> Initial issuance	<input type="checkbox"/> General permit
<input type="checkbox"/> Permit modification	<input type="checkbox"/> Conditional major
__Administrative	<input checked="" type="checkbox"/> Title V
__Minor	<input checked="" type="checkbox"/> Synthetic minor
__Significant	<input type="checkbox"/> Operating
<input type="checkbox"/> Permit renewal	<input checked="" type="checkbox"/> Construction/operating

COMPLIANCE SUMMARY:

<input type="checkbox"/> Source is out of compliance	<input type="checkbox"/> Compliance schedule included
<input checked="" type="checkbox"/> Compliance certification signed	

APPLICABLE REQUIREMENTS LIST:

<input type="checkbox"/> NSR	<input checked="" type="checkbox"/> NSPS	<input checked="" type="checkbox"/> SIP
<input type="checkbox"/> PSD	<input checked="" type="checkbox"/> NESHAPS	<input type="checkbox"/> Other
<input checked="" type="checkbox"/> Netted out of PSD/NSR	<input type="checkbox"/> Not major modification per 401 KAR 51:001, 1(116)(b)	

MISCELLANEOUS:

- ☐ Acid rain source
- ☐ Source subject to 112(r)
- ☒ Source applied for federally enforceable emissions cap
- ☒ Source provided terms for alternative operating scenarios
- ☒ Source subject to a MACT standard
- ☐ Source requested case-by-case 112(g) or (j) determination
- ☐ Application proposes new control technology
- ☒ Certified by responsible official
- ☒ Diagrams or drawings included
- ☐ Confidential business information (CBI) submitted in application
- ☐ Pollution Prevention Measures
- ☒ Area is non-attainment (list pollutants): Ozone (8- HR), PM 2.5

**EMISSIONS SUMMARY:**

Pollutant	2005 Actual (tpy)	Potential (tpy)
PM	134	1834.9
PM <sub>10</sub>	134	1834.9
SO <sub>2</sub>	2111	2230.6
NO <sub>x</sub>	2512	3339.7
CO	1223	2551.7
VOC	2391	3499.2
Benzene	32.7	15.2
Cumene	18.3	40.8
Ethylbenzene	1.6	36.6
Methyl Tert-Butly Ether	unknown	324.0
Naphthalene	3.1	14.0
Toluene	9.1	47.4
Xylenes (Total)	3.8	11.0
Total HAPs	93	502.5

**SOURCE DESCRIPTION:**

Marathon Petroleum Company at the Catlettsburg Refining, LLC (CRLLC) processes petroleum crude oil to produce gasoline, diesel fuel, kerosene, jet fuel and petroleum derivatives such as petrochemicals and lube oil feed stock. Besides the crude oil processing units, the refinery has boilers, sulfur plants, waste water treatment and hydrogen generation unit. Raw crude, refined petroleum products, and intermediates are stored in the storage tanks for distribution and further processing.

The refinery at Catlettsburg uses the Big Sandy River to transport domestic crude oil and product distribution in barges. Besides the river transportation, there are railroad tank cars and truck loading and unloading facilities at different areas of the refinery used for efficient movement of transportation fuels, lube oil feed stock and petrochemicals. Viney Branch transfer racks are provided with a Vapor Recovery Unit (VRU) to absorb volatile organic compounds (VOC) in the activated carbon during loading operation. Activated carbon is regenerated by vacuum by using vacuum pump and the vapor is condensed to recover the hydrocarbon liquid. The vapor recovery system has an absorption and regeneration cycle. VOCs during solvent loading in the trucks and rail cars uses the Vapor Destruction Unit (VDU) to reduce the air emissions.

The light gases produced during the processing of the crude oil are used by the refinery sweet fuel gas system after being treated with amines. The refinery fuel gas is used for process heaters, steam generating boilers, flares and incinerators.

Amines are regenerated for recycling. Amine regenerator off-gas along with foul water stripper off-gas from the wastewater treatment area, are directed to the sulfur plant. The sulfur plant produces metallic sulfur in the Claus reactors and reduces the sulfur dioxide (SO<sub>2</sub>) emission from refinery. Some of the heaters and boilers at the refinery are provided with low nitrogen oxide (NO<sub>2</sub>) burners to reduce NO<sub>x</sub> emissions to the ambient air.

The refinery has one Fluidized Catalytic Cracking (FCC) unit, two Catalytic Cracking Reformer (CCR) units and one HF Alkylation unit to produce and improve the Research (RON) and Motor (MON) octane for the three grades of gasoline distributed in the pumps.

The CRLLC has a Lube Oil Complex to produce Lube Feed stock. Lube crude is processed in the #5 crude unit, and the lube vacuum unit makes the 100N and 325N waxy distillate. Waxy distillates are further treated in the Furfural Extraction unit and MEK De-waxing units to produce salable lube feed stock.

The CRLLC also manufactures petrochemicals such as cumene, solvents and other products to be further processed in the chemical industry. Some of the aromatics are also produced in the petrochemical area such as benzene, toluene, xylene, and naphthalene. The refinery brings in Coal Tar Light Oil (CTLO) from the coal industry to meet the demand of benzene in the manufacture of cumene. Light liquid from the reformers and distilled liquids from the CTLO are separated in the Sulfolane Unit liquid-liquid extraction process to produce benzene, toluene and xylene.

The refinery has two independent waste water systems: Oily water sewer system and NESHAP regulated waste water system. The NESHAP water is being collected in collection pits through out the refinery process units and pumped to a storage tank. Water from the storage tank before going to the common treatment facility is being treated in the Benzene Recovery Unit (BRU).

For the purpose of the Title V initial operating permit, the refinery has been broken down into nine areas based on the similarity of the process and state air regulations:

1. Transfer Racks: Loading/unloading raw materials and products;
2. Flares;
3. Cooling Towers;
4. Heaters, Boilers and Combustion Devices;
5. Process Units;
6. Storage Vessels;
7. General Wastewater Treatment Area
8. Benzene Wastewater Treatment Area
9. Remediation

**EMISSION AND OPERATING CAPS DESCRIPTION:**

Pursuant to 40 CFR 63.560(b)(2), in order to preclude the applicability of 40 CFR 63 Subpart Y Sections 63.562 (c) and (d), as referenced by 40 CFR 63 Subpart CC Section 63.651(a), the following loading limits shall not be exceeded at the marine tank vessel loading operations:

<b>Product</b>	<b>Loading Limit (million bbl/year)</b>
Gasoline	10
Crude Oil	200

Emissions due to loading materials at the Viney Branch transfer rack shall not exceed 36 tons of VOC during any consecutive 12-month period. [To preclude the applicability of 401 KAR 51:017, PSD, for VOC emissions]

Pursuant to 40 CFR 63.560(a)(2), in order to preclude the applicability of 40 CFR 63 Subpart Y Sections 63.562 (b) and (d), as referenced by 40 CFR 63 Subpart CC Section 63.651(a), the following emission limits shall not be exceeded at the marine tank vessel loading operations. Emissions shall be calculated using the methods specified in 40 CFR 63.565(l).

<b>Pollutant</b>	<b>Any consecutive 12-months period Emission Limit (ton/year)</b>
Each Individual HAP	10
All Combined HAP	25

VDU 1-7-B-1 shall control loading emissions from the New Solvent Truck Loading Rack (L004) with a VOC destruction efficiency of at least 98%. [To preclude the applicability of 401 KAR 51:017, PSD, for VOC emissions]

The use of chromium based water treatment chemicals is prohibited [Requirement to preclude applicability of 40 CFR 63, Subpart Q].

The source has elected to accept permit conditions to preclude the applicability of 401 KAR 51:017, PSD as follows: PM10 emissions from the New North Area Cooling Tower (2-603-CT-9) shall not equal or exceed 14 tons per year based on a 12-month rolling total.

The source has elected to accept permit conditions to preclude the applicability of 401 KAR 51:017, PSD as follows: [Permit VF-02-001 (Revision 3) and revised in V-05-089]

Affected Units	Maximum Emissions (tons/yr)				
	SO <sub>2</sub>	NO <sub>x</sub>	VOC	CO	PM <sub>10</sub>
H001 (1-002-B-003) No. 2 Crude Charge Heater	14.7	54.8	3.0	46.0	4.2

In addition, heat input to the No. 2 Crude Charge Heater shall not exceed 125.0 mmBtu/hr, HHV based on a 365-day rolling average.

The source has elected to accept permit conditions to preclude the applicability of 401 KAR 51:017, PSD as follows: [Permit S-96-207]

Affected Units	Maximum Emissions (tons/yr)
H014 (1-035-B-003) #1 Cumene Column Reboiler	Nitrogen oxides (NO <sub>x</sub> ) emissions shall not equal or exceed 39 tons/yr

The source has elected to accept permit conditions to preclude the applicability of 401 KAR 51:017, PSD as follows: [Permit VF-02-001 (Revision 3) and revised in V-05-089]

Affected Units	Maximum Emissions (tons/yr)				
	SO <sub>2</sub>	NO <sub>x</sub>	VOC	CO	PM <sub>10</sub>
H019 (2-026-B-002) No. 4 Vacuum Charge Heater	15.1	39.9	3.1	47.1	4.3
H020 (2-023-B-006) No. 4 Vacuum Charge Heater	18.8	97.8	3.8	58.7	5.3

The source has elected to accept permit conditions to preclude the applicability of 401 KAR 51:017, PSD as follows: [Permit VF-02-001 (Revision 3)]

Affected Units	Maximum Emissions (tons/yr)				
	SO <sub>2</sub>	NO <sub>x</sub>	VOC	CO	PM <sub>10</sub>
H021 (2-023-B-003) No. 3 Crude Charge Heater	20.8	54.3	4.65	65.2	5.9
H022 (2-023-B-004) No. 3 Crude Charge Heater	20.8	54.3	4.65	65.2	5.9

In addition, heat input to the No. 3 Crude Charge Heaters shall not exceed 177.1 mmBtu/hr, each, based on a 365-day rolling average.

The source has elected to accept permit conditions to preclude the applicability of 401 KAR 51:017,

PSD as follows: [Permit VF-02-001 (Revision 3)]

Affected Units	Maximum Emissions (tons/yr)				
	SO <sub>2</sub>	NO <sub>x</sub>	VOC	CO	PM <sub>10</sub>
H023 (2-030-B-001) Sat Gas Plant Heater	21.0	54.6	4.3	65.6	5.9

In addition, heat input to the Sat Gas Plant Heater shall not exceed 178.2 mmBtu/hr HHV, based on a 365-day rolling average.

The source has elected to accept permit conditions to preclude the applicability of 401 KAR 51:017, PSD as follows: [Permit VF-02-001 (Revision 3)]

Affected Units	Maximum Emissions (tons/yr)				
	SO <sub>2</sub>	NO <sub>x</sub>	VOC	CO	PM <sub>10</sub>
H028 (2-036-B-001) HF Alky Isostripper Reboiler	11.1	41.4	2.3	34.8	3.1

In addition, heat input to the HF Alky Isostripper Reboiler shall not exceed 95 mmBtu/hr. Each of these limits is based on a 365-day rolling average.

The source has elected to accept permit conditions to preclude the applicability of 401 KAR 51:017, PSD as follows: [Permit VF-02-001 (Revision 3)]

Affected Units	Maximum Emissions (tons/yr)				
	SO <sub>2</sub>	NO <sub>x</sub>	VOC	CO	PM <sub>10</sub>
H029 (2-036-B-002) HF Alky Hot Oil Heater	2.3	8.7	0.5	7.3	0.7

In addition, heat input to the HF Alky Hot Oil Heater shall not exceed 20 mmBtu/hr HHV. Each of these limits is based on a 365-day rolling average.

The source has elected to accept permit conditions to preclude the applicability of 401 KAR 51:017, PSD as follows: [Permit VF-02-001 (Revision 3)]

Affected Units	Maximum Emissions (tons/yr)				
	SO <sub>2</sub>	NO <sub>x</sub>	VOC	CO	PM <sub>10</sub>
H034 (2-103-B-001) LPVGO Hydrotreater Charge Heater	5.8	21.7	1.2	18.2	1.6
H035 (2-103-B-002) LPVGO Hydrotreater Charge Heater	5.8	21.7	1.2	18.2	1.6
H036 (2-103-B-003) LPVGO Hydrotreater Stripper Heater	6.5	24.1	1.3	20.2	1.8

In addition, heat input to the LPVGO Hydrotreater Charge Heaters shall not exceed 50 mmBtu/hr HHV, each heater, and heat input to the LPVGO Hydrotreater Stripper Reboiler shall not exceed 55 mmBtu/hr HHV. Each of these limits is based on a 365-day rolling average.

The source has elected to accept permit conditions to preclude the applicability of 401 KAR 51:017, PSD as follows: [Permit VF-02-001 (Revision 3)]

Affected Units	Maximum Emissions (tons/yr)				
	SO <sub>2</sub>	NO <sub>x</sub>	VOC	CO	PM <sub>10</sub>
H037 (2-104-B-001) HPVGO Hydrotreater Charge Heater	11.7	23.8	2.4	36.4	3.3
H038 (2-104-B-002) HPVGO Hydrotreater Charge Heater	11.7	23.8	2.4	36.4	3.3

In addition, heat input to the HPVGO Hydrotreater Charge Heaters shall not exceed 99 mmBtu/hr HHV, each heater, based on a 365-day rolling average.

The source has elected to accept permit conditions to preclude the applicability of 401 KAR 51:017, PSD as follows: [Permit C-91-051 (Revision 3) and Permit VF-02-001 (Revision 3)]

Affected Units	Maximum Emissions (tons/yr)				
	SO <sub>2</sub>	NO <sub>x</sub>	VOC	CO	PM <sub>10</sub>
H043 (2-121-B-001) DDS Reactor Charge Heater	7.1	11.5	1.5	22.3	2.0
H044 (2-121-B-002) DDS Reactor Charge Heater	7.1	11.5	1.5	22.3	2.0
H045 (2-121-B-003) DDS Reactor Stripper Reboiler	11.0	17.8	2.3	34.4	3.1

In addition, heat input to the Distillate Desulfurizer Reactor Charge Heaters shall not exceed 61 mmBtu/hr, each heater, and heat input to the Distillate Desulfurizer Stripper Reboiler shall not

exceed 94 mmBtu/hr HHV. Each of these limits is based on a 365-day rolling average.

The source has elected to accept permit conditions to preclude the applicability of 401 KAR 51:017, PSD as follows: [Permit C-92-033 (Revision 2)]

Affected Units	Maximum Emissions (tons/yr)
H046 (1-044-B-001) CCR #2 Charge Heater H047 (1-044-B-002) CCR #2 No. 1 Interheater H048 (1-044-B-003) CCR #2 No. 2 Interheater H049 (1-044-B-004) CCR #2 No. 3 Interheater H050 (1-044-B-005) CCR #2 Reboiler	Total nitrogen oxides (NO <sub>x</sub> ) and sulfur dioxide (SO <sub>x</sub> ) emissions shall not equal or exceed 39 tons/yr

The source has elected to accept permit conditions to preclude the applicability of 401 KAR 51:017, PSD as follows: [Permit VF-04-001]

Affected Units	Maximum Emissions (tons/yr)				
	SO <sub>2</sub>	NO <sub>x</sub>	VOC	CO	PM <sub>10</sub>
H051 (2-122-B-001) KDS Charge Heater	6.30	11.7	1.3	19.6	1.8

The source has elected to accept permit conditions to preclude the applicability of 401 KAR 51:017, PSD as follows: [VF-01-005].

Affected Units	Maximum Emissions (tons/yr)
	NO <sub>x</sub>
B014 (2-601-B-004) No. 4 Boiler	401

The source has elected to accept permit conditions to preclude the applicability of 401 KAR 51:017, PSD as follows: [VF-02-001 (Revision 3)]

Affected Units	Maximum emissions (ton/yr)				
	SO <sub>2</sub>	NO <sub>x</sub>	VOC	CO	PM <sub>10</sub>
(New) FCCU (including Heat Recovery Units North and South and Number 5 Package Boiler)	256.0	365.0	55.0	448.0	265.4

In addition, heat input to each of these heat recovery units shall not exceed 431 mmBtu/hr (HHV),



based on a 365-day rolling average, and heat input to the Number 5 Package Boiler shall not exceed 249 mmBtu/hr (HHV), based on a 365-day rolling average.

The source has elected to accept permit conditions to preclude the applicability of 401 KAR 51:017, PSD as follows: [VF-02-001 (Revision 3)]

Affected Units	Maximum emissions (tons/yr)				
	SO <sub>2</sub>	NO <sub>x</sub>	VOC	CO	PM <sub>10</sub>
No. 1 SRU Thermal Oxidizer	323.0	25.0	1.4	21.0	2.0
No. 2 SRU Thermal Oxidizer					

In addition, sulfur production shall not exceed 628 long tons per day, based on a 365-day rolling average. Also, heat input to each thermal oxidizer shall not exceed 28.6 mmBtu/hr (HHV) based on 365-day rolling average. [State-only Requirements from VF-02-001 (Revision 3)]

Emission Unit	Refinery ID
T081	1-6-T-81
T152	1-6-T-152
T701	2-606-T-701
T702	2-606-T-702
T733	2-606-T-733
T734	2-606-T-734
T783	2-606-T-783
T821	2-606-T-821
T845	2-606-T-845
T855	2-606-T-855
T856	2-606-T-856
T910	2-606-T-910
T911	2-606-T-911
T912	2-606-T-912
T913	2-606-T-913
T920	2-606-T-920

The source has elected to accept permit conditions to preclude the applicability of 401 KAR 51:017, Prevention of Significant Deterioration as follows: VOC emissions from the above storage vessels shall not exceed 51.9 tons per year, excluding emissions from equipment leaks, and based on a 12-month rolling sum, calculated monthly. [Permit VF-02-001 (Revision 3)]

Pursuant to 40 CFR 63:021 (requirements from permit O-93-016 general condition 20), emissions of the following toxic air pollutants shall not exceed the limits listed below:

Cumene	57.1 lbs/hr	8 hour ave.
Xylene	97.2 lbs/hr	8 hour ave.
Toluene	58.9 lbs/hr	8 hour ave.
1,3 Butadiene	26.1 lbs/hr	8 hour ave.
Trimethylbenzene	156.4 lbs/hr	8 hour ave.
Naphthalene	69.4 lbs/hr	8 hour ave.
Methylene chloride	138.2 lbs/hr	8 hour ave.
Methyl ethyl ketone	720.8 lbs/hr	8 hour ave.
Nonane	306.6 lbs/hr	8 hour ave.
Methanol	37.3 lbs/hr	8 hour ave.
n-Hexane	235.4 lbs/hr	8 hour ave.
Furfural	1.8 lbs/hr	8 hour ave.
Chrysene	0.0059 lb/hr	BACT

### **OPERATIONAL FLEXIBILITY:**

#### FCCU Hydro-treaters (HPVGO, LPVGO) Outage Plan:

Pursuant to the US EPA Consent Decree, during periods of hydro-treater outage, the permittee can elect to comply with the short-term SO<sub>2</sub> limits or alternatively with actions included in the approved Hydro-treater Outage Plan.

Pursuant to the US EPA Consent Decree, during periods of hydro-treater outage, the permittee can elect to comply with the short-term NO<sub>x</sub> limits or alternatively with actions included in the approved Hydro-treater Outage Plan.

#### SRU Sulfur Shedding Plan:

Sulfur shedding plan will be followed as necessary when both SRU#1 and SRU#2 are inoperable. The plan shall be undertaken in the sequence necessary to achieve compliance as expeditiously as practicable.